

Benjamin P. Lutkoski. A Content Analysis of North Carolina State Agency Twitter Feeds. A Master's Paper for the M.S. in I.S degree. April, 2011. 50 pages. Advisor: Paul Jones

Twitter is the world's most popular micro-blogging service. Since 2005 the number of individual and organizational users has expanded dramatically. This study examines Twitter use by ten North Carolina State Government Agencies. Using the principles of grounded theory, a content analysis of these ten feeds was conducted in an attempt to define Twitter use and user intention. Tweets are categorized by Information Type and Subject. Most tweets were found to announce an activity or event. The study also identified a distinct division between Agencies who used Twitter as a tool for conversation and those who did not. Tweets were found to primarily broadcast information in contrast to the typical individual user described by several scholars.

#### Headings:

Twitter

North Carolina – Politics and Government

Content Analysis

A CONTENT ANALYSIS OF NORTH CAROLINA STATE AGENCY TWITTER FEEDS

by  
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A Master's paper submitted to the faculty  
of the School of Information and Library Science  
of the University of North Carolina at Chapel Hill  
in partial fulfillment of the requirements  
for the degree of Master of Science in  
Information Science.

Chapel Hill, North Carolina

April 2011

Approved by

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## **Introduction**

In the five years since Twitter was introduced to the public in 2006, it has become the world's most popular micro-blogging service. Twitter allows users to post 140 character messages using their mobile phone, smart phone, or computer. Through their messages, or "tweets," users can create a social network by choosing to follow others and by attracting others to follow them. Users have developed a coding system that has become widely adopted by other internet and social media sites: "@username" allows users to direct messages to specific individuals or groups, "RT" (re-tweet) passes along information posted by others, and "#" indicates subjects or topical categories. The Pew Internet and American Life Project (2009) estimates that 19% of Internet users tweet or use similar status updating services, an increase of 8% over their last survey in 2008.

Reaction to Twitter in the media has ranged from ebullient and effusive to crass and dismissive. In a survey of Twitter press coverage, Arceneaux and Weiss (2010) found that the media response generally conforms to historical trends of press reactions to new technology. The two authors sampled traditional and new media coverage of Twitter from 2006 through 2009 and found that most reporting was primarily explanatory, emphasizing the perceived benefits of Twitter in commercial, civic, and personal settings. A minority of coverage was negative and focused on how its convenience will encourage users to violate formerly protected

spaces. When examining reports of Twitter by civic organizations, the authors found that many articles emphasized the ability of the government to provide information to citizens as part of public education campaigns or in emergency situations.

This study was prompted by an interest in social media use by state and local governments. Public officials offer several explanations for their use of social media tools, including Twitter, as a means of communicating with the public. Bev Goodwin, director of the General Service Administration's USA.gov, argues that in order to reach the public, government agencies need to make use of the same resources as their constituents: "The whole goal is to get information out where people are going...They're going to YouTube, not government video sites" (Newell, 2009, p. 18). Others explain their adoption of social media as a way of communicating reliable and accurate public information in a time when media coverage of state and local issues is in decline (Rose, 2009).

In this paper I will examine the use of Twitter by ten North Carolina State Government Agencies and Departments. This study is concerned with what Agencies say when they tweet and the types of messages that are being broadcast. This content analysis of State Agency Twitter feeds is an attempt to explain how Twitter is being used by North Carolina State Agencies. The paper will begin with a review of scholarly work evaluating behavior on Twitter. It will next discuss different forms of government communication. There will then be an explanation of the research methods and design of the study. It will next summarize the results

and draw conclusions from the data. Finally, there will be a critique of the study and suggestions for further research.

## **Related Works**

### **Twitter**

Although Twitter is a relatively new service, there have already been several academic studies that explore its use. Most of these works focus on individual Twitter users and attempt to explain how and why it is being used. The corpora and research are different in each study, but in general scholars are interested in the degree to which Twitter is used as a method of information exchange.

In an early study of Twitter users, Java, Song, Finin and Tseng (2007) investigate the intentions and roles of individual Twitter users and Twitter communities. The group identified three categories of Twitter user. The majority of Twitter users fall into the Friends category, groups of users with high levels of message reciprocity and a high degree of tweet correlation. An individual may fall into one or more Friend communities. Those with a large number of followers are labeled an Information Source. They serve as the hub of a network and, though the frequency of their posts may vary, they are sure to be read by many people. Information seekers, the final group of Twitter users, tweet infrequently but follow a number of Friends and Information Sources. The authors also identified four types of user intentions. According to Java, Song, Finin and Tseng a majority of tweets can be considered Daily Chatter about routine and conventional matters. They found that 12.5% of tweets are Conversations between users indicated by the use of the @

symbol. 13% of tweets examined contained a URL and were labeled Sharing Information/URL. The remaining tweets consisted of automated RSS feeds and were categorized as News.

Honey and Herring (2009) conducted a content analysis of personal tweets with the intention of identifying if, and how, Twitter advances conversation between members of a community. The two researchers developed 12 content themes to classify the types of information conveyed in a tweet. The themes range from personal messages, to opinions, to meta-commentaries on the use of Twitter itself. Of the tweets they examined the majority (41%) can be categorized as Self Experience—reports or comments on what is happening to an individual. Other highly ranked content themes include tweets about an addressee (11%), tweets about media use (9%), announcements to the Twitter community (7%), and the expression of an opinion (6%). In a surprising and interesting note they found that around 30% of all tweets use @ as part of a personal message or conversation—more than twice the use of @ found by Java, Song, Finin, and Tseng. The authors conclude that such an increase in just two years suggests that Twitter is quickly become a more interactive media

The idea of Twitter communities is also explored by Zhao and Rosson (2009) who conducted in-depth interviews with 11 workers in an IT company. They found that the positive aspects of Twitter use while at work generally mirrors other types of informal communication, such as improving perception of others and establishing common ground with colleagues. Although their focus was on Twitter as a means of professional communication, they found that users had difficulty distinguishing

personal from professional content. Zhao and Rosson did not conduct an analysis of tweets, but based on their interviews they found that Twitter use broadly reflects the categories identified by Java, Song, Finin, and Tseng. They note that users appreciated the ability to frequently post brief personal updates and real-time information. Interviewees noted an affordance of Twitter, what one user called a “people-based RSS feed,” where personally relevant information can be easily aggregated. In an interesting note on information quality, the authors found that “From a reader’s perspective, information posted by a person the reader has deliberately selected to follow is perceived as useful and trustworthy” (p. 247).

In 2009 Pear Analytics, a social media and search engine consulting group, conducted a content analysis of 2,000 randomly selected tweets collected over a two-week period. They found that the vast majority of tweets studied were either Conversational (37.55%) or, with 40.55% of the total, what they call Pointless Babble. They considered tweets like “I’m eating a sandwich” Pointless Babble because they offer little of informational value. Use of the remaining categories, Pass Along, News, Spam, and Self-Promotion, did not rise above single digit percentages. The authors expected organizations to use Twitter to post news or self-promotions but found low frequencies in these categories, which might indicate that there are more individual Twitter users than organizational users.

Jansen, Zhang, Sobol and Chowdhury (2009) make one of the few attempts to research Twitter use by a company or organization. They studied the relationship between corporations and consumers, particularly patterns of communication between consumers and companies through Twitter and the

effectiveness of branding via electronic word of mouth. Using sentiment analysis they examined tweets expressing opinions on 50 brands and placed them on a five-point scale ranging from Great to Wretched. Of the tweets expressing sentiment they found that almost half of brand-related tweets were generally positive or very positive while only 18% expressed a wretched opinion. The authors also examined the subjects that the organizations tweeted about and with what frequency corporations were communicating with customers via Twitter by examining several thousand tweets from three of the official Starbucks Twitter feeds. Not surprisingly, they found that Starbucks tweeted most frequently about coffee, beverages, and events. Announcements and references to Twitter were also tweeted frequently. Over a three-month period they found that Starbucks tweeted directly with only 2.7% of its followers and responded to 20.4% of all tweets. In general, a large minority of customers accounted for almost half of tweets referencing or directed to Starbucks.

In a 2010 study Golbeck, Grimes and Rogers examined the use of Twitter by U.S. Congressional Representatives. Following methods developed by Honey and Herring, the group categorized the tweets of all 69 Representatives using the service. They based their categorization on the tweets' type and information intent. The authors found that 55% of the tweets can be considered informational, followed by tweets broadcasting a location or unofficial activity (27%) and communication with people outside of Congress (7%). Of the informational tweets the authors write that they resembled press releases and found that 72% contained a link or URL, mainly to longer posts written by the representative. They found few



examples of conversations between Representatives and a mere 1% of the posts used re-tweets or hash tags. The authors conducted two follow-up studies several months later that confirmed their results.

Interesting differences emerge between a Congressional Twitter user, an organizational Twitter user, and an individual Twitter user. Tweets by organizations and Representatives tend to be more informational and less conversational than those by individuals. Representatives did use Twitter to communicate with others to a greater degree than did organizations when compared with the findings of Jansen, Zhang, Sobol, and Chowdhury. But, conversational or communicative tweets by both Representatives and organizations fall far below the individual communication rate found by Honey and Herring and Pear Analytics. Unlike personal and organizational Twitter users, Congressional tweets are also more likely to contain a URL, which seems to indicate that they aim to share more information than a typical tweet.

### **Government Communication**

Discussions of government information tend to focus on the relatively exciting political arena, particularly campaigns, rather than the more mundane world of bureaucratic communication. However, e-Government (digital government systems) is widely studied, and treatment of this subject is relevant to the present study.

A central theme in the discussion of e-Government is the idea of system evolution or maturation. Chadwick and May (2003) highlight this topic in an analysis of three models of e-Government systems: managerial, consultive, and

participatory. The authors write that the initial, and most basic, e-Government state is managerial with the central purpose of providing efficient information to users.

Of the managerial model they write, “This is the ‘push’ model of information dissemination: the state will place information in accessible forums and the onus is on the user to access it” (p. 278). The consultive model, where the government seeks out public opinion, describes more mature e-Government systems. To Chadwick and May e-Government reaches its greatest potential in the participatory model where knowledge and information flows freely between the government and the public. They envisage a cyber-society where citizens can engage in policy making as much as in civil society today. The researchers argue that the public is more likely to engage in civic and government activity when governments use the participatory model because the bar for involvement is so much lower.

Elmagarmid and McIver (2001) focus less on public participation in their four-tiered description of e-Government development. Like Chadwick and May they argue that presenting information to the public is the most basic form of e-Government, followed by systems which allow two-way communication between the government and the public. The next level is characterized by the online processing of complex government services. The final level of e-Government provides a number of services from different levels of government integrated into easily accessible portals.

Bimber (2003) argues that information and techniques of information dissemination are central to ideas of American democracy. He argues that changes in technology and information distribution have directly shaped the ways we think

about our core national tenants. Bimber feels, for example, that the growth in mass communication and information technology has led to the idea of a national, versus a state-based, identity and the sense of affiliation to a political party. Indeed, he traces the idea that a good citizen is an informed citizen to the Progressive era when daily newspapers became widely available. As with other information-driven revisions to American democracy, Bimber feels that rapid technological development will lead to changes in civic life. He writes, "Technology is increasing the complexity and specialization of information while at the same time decreasing its cost, thereby making abundant political information and communication available to anyone with the motivation to acquire it, provided they have access to information technology," (p. 21). This abundance of information, Bimber feels, will decrease the importance of the political party and increase the importance of, and opportunity for, grassroots political action.

### **Methods**

This study is based in the principles of grounded theory, an approach that was used successfully in similar works by Golbeck, Grimes and Rogers in their analysis of Twitter use in Congress and by Honey and Herring in their examination of Twitter conversations. According to Glasser and Strauss (1967) grounded theory allows researchers to generate and adapt theories throughout the course of a study based on their findings, rather than approaching a study with a hypothesis to prove or disprove. They write, "Generating a theory from data means that most hypotheses and concepts not only come from the data, but are systematically

worked out in relation to the data during the course of the research process” (p. 6). Researchers using grounded theory avoid situations where conclusions are hastily tacked on to otherwise well crafted studies. Instead, this method attempts to move theory and data closer together. Key to grounded theory is the idea that the researcher is open to pursue new concepts or modify methods when presented with new evidence. The system outlined by Glasser and Strauss fits the needs of this study because of the precedence set by other Twitter researchers and because it allows a researcher to study data without having to prove or disprove an explicitly stated hypothesis. The study of Twitter is so new that it seems wise to let observation generate theory that can be validated over time as additional data becomes available.

The North Carolina Office of the Governor currently lists 13 Twitter accounts on the State social media webpage. Three of these feeds are inactive. The remaining ten are listed in Table 1. Tweets were harvested and downloaded to a CSV file on February 18, 2011 using DiscoverText, a social media and text-harvesting tool.<sup>1</sup> It was not possible to harvest an equal number of tweets from each agency due to issues of tweet frequency and DiscoverText’s limited ability to interact with Twitter’s API. DiscoverText also harvests a number of metadata values, such as the time the tweet was sent and the tweeting platform (Blackberry, iPhone, TweetDeck, etc.).

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<sup>1</sup> [www.discovertext.com](http://www.discovertext.com)

<i>Table 1.</i>		
Number of Tweets by Agency		
<b>Agency</b>	<b>Tweets Harvested</b>	<b>Tweets Coded</b>
Department of Commerce	196	172
Department of Corrections	134	108
Department of Environment & Natural Resources	175	145
Museum of Natural Science	143	121
Office of the Governor	156	134
Pollution Prevention & Environmental Assistance (PP&EA)	192	153
State Chief Information Officer	26	22
State Highway Patrol	115	94
Tourism Office	196	165
Wine & Grape Council	200	167
<b>Total</b>	<b>1,533</b>	<b>1,281</b>

Based on the observation that a number of tweets contained a URL linking out to other websites, the primary investigator determined that these external sites could lend context to the 140 character tweets. Coders visited each link and attached a headline or short description from the Web page to the source tweet.

Following the works of Pandit (2006), Golbeck, Grimes and Rogers, and Honey and Herring, coders developed tweet categories using an open coding approach. Over the course of collecting headlines from URLs, coders asked what Pandit calls “the simple questions”: what, where, how, when, how much, etc. Based on these observations, a set of categories was developed which classifies the Subject of the tweet and the manner in which the information was presented—the Information Type. The primary investigator created a training sample of 150 randomly selected tweets, or 10% from each Twitter feed. While reviewing and

coding the training sample, the coders discussed revisions of the Subject and Information Type categories. A comparison of the training sample results led the primary investigator to further revise the categories. Following category creation rules set out by Riffe, Lacy and Fico (2005), categories were defined in an attempt to be exhaustive and mutually exclusive. The final list included a total of 25 Subject and seven Information Type categories. Appendix A has full category descriptions.

In order to boost the validity of the data, three coders each reviewed two-thirds of the corpus so that every tweet was coded twice. Coding took place simultaneously over several sessions with coders discussing categories and coding rules to ensure that they were applied uniformly. When inter-coder reliability was calculated at the conclusion of coding, two issues emerged. First, coders had consistently applied certain Subject and Information Type categories differently. For example, one coder used the ANNOUNCEMENT Information Type category for tweets more suited to the PUBLIC SERVICE ANNOUNCEMENT category. There was also variation in the way the ACTIVITY, EVENT and FAIRS AND FESTIVALS Subject categories were used. The primary investigator resolved these inconsistencies in consultation with the coders. The large number of Subject categories also lowered inter-coder reliability. Rules allowed coders to use more than one Subject category for a single tweet when appropriate. 10.6% of tweets were coded with more than one Subject category, but these multi-subject tweets usually represented a partial match, which lowered inter-coder reliability. In instances with a partial Subject match, the primary investigator decided to preserve the matching category, resulting in a rise in inter-coder reliability.

Crude weighted inter-coder reliability was calculated by Information Type at .9380 and by Subject at .8482. Crude reliability between all coders is .8931. Scott's  $\pi$ , a measure that corrects for chance agreement, was calculated between coders at .8804. Despite an overall crude reliability of .8931, analysis of the tweets requires perfect reliability—that is, a match for both Subject and Information Type categories. .8356 of tweets were perfectly reliable, which means that the results are based on the analysis of 1,281 tweets. While there is no existing standard for inter-coder reliability, a reliability of .80 or greater should be acceptable to most, according to Neuendorf (2002). See Appendix B for a breakdown of inter-coder reliability. When chi-square was calculated, it showed a probability of less than .0001, demonstrating a high degree of significance. However, over 20% of categories had a frequency less than five, which indicates that the chi-square calculation might be suspect.

## **Results**

This section will break down the results of coding by Information Type and by Subject. Charts and tables describing the results in full can be found in Appendix C and Appendix D. The ten agencies differ in mission and responsibility, leading to variation in the application of Information Type and Subject categories; nevertheless, several trends are apparent in the data.

ANNOUNCEMENTS, with 54.6% of the total body (as observed in Figure 1), represents the most frequently tweeted Information Type. The ANNOUNCEMENTS category was designed to capture a simple statement about a fact or an occurrence. Sample tweets include:

- More jobs! Gov Perdue announces 100 jobs with Novartis! #jobsnow  
<http://ht.ly/3tfEr> (Commerce, 107)
- New warden for state's largest women's prison <http://bit.ly/9lqA1v>  
(Corrections, 50)
- Lecture at noon TODAY: Bonobos of the Congo <http://bit.ly/dodurv> Sorry  
for the late notice! (Natural Sciences, 112)

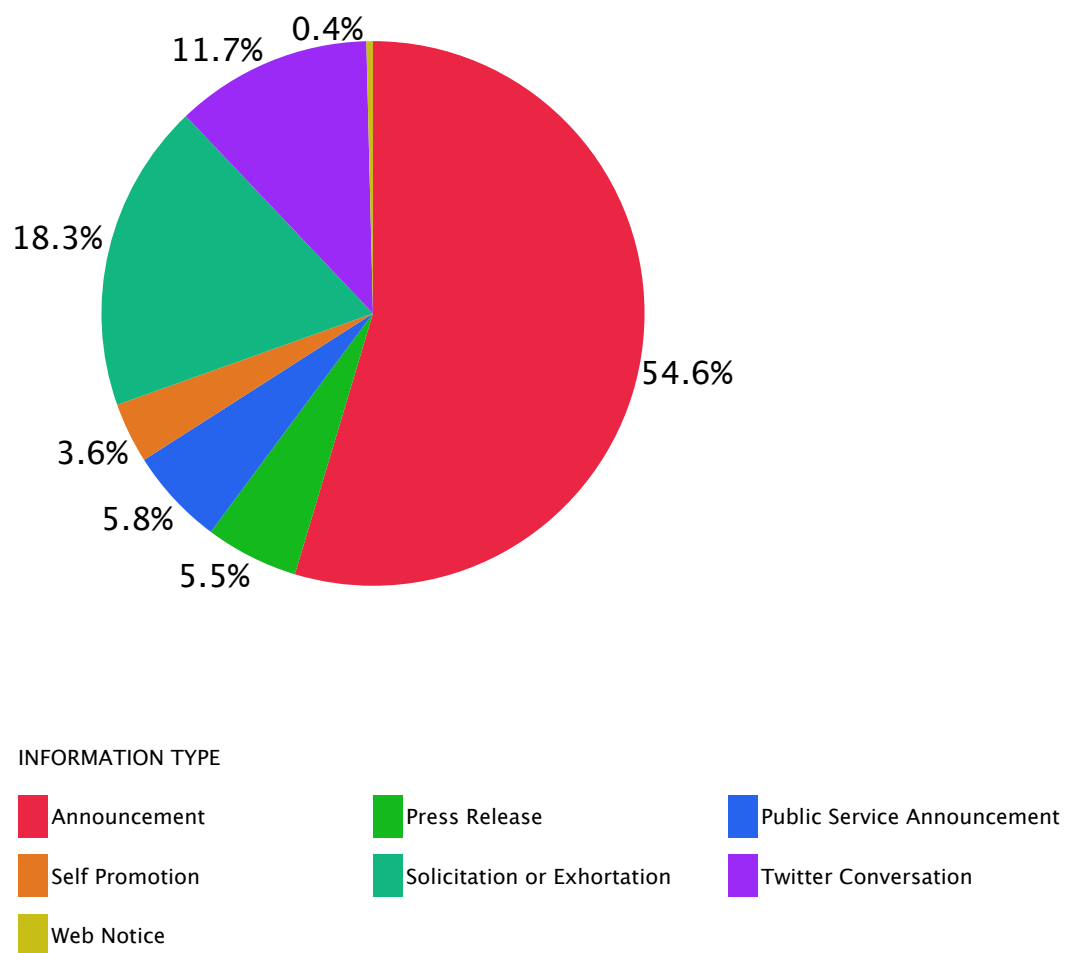
With the exception of the 24.1% in the Governor's Office, ANNOUNCEMENTS account for over 50% of every Agency's Twitter feed.

18.3% of tweets fall into the SOLICITATION AND EXHORTATION Information Type category. SOLICITATIONS AND EXHORTATION tweets ask readers to take part in an activity: "Tomorrow at 11 am, join us for a special family presentation on "Plant Diseases and How They Change Our World": <http://bit.ly/c8>" (Natural Sciences, 28). These tweets also ask for reader input: "Have you taken the "Budget Challenge" yet? Help us get to 10k submitted proposals. <http://bit.ly/dWOo5L>" (Governor's Office, 10). The Department of Commerce, Museum of Natural Science and Wine and Grape Council use SOLICITATIONS AND EXHORTATIONS most often. In these three Agencies, SOLICITATIONS AND EXHORTATIONS represent the second most frequently used Information Type category, and their combined use of the Information Type represents 57% of all SOLICITATION AND EXHORTATIONS.

11.7% of tweets are part of a TWITTER CONVERSATION. These tweets are most often addressed to a particular user: "@3RIc9377mAN Thanks for the question. We are still in a state of emergency. It is set to expire Friday at noon." (Governor's Office, 132). Some TWITTER CONVERSATION tweets are part of a discussion in a larger Twitter



Figure 1. Tweet Frequency of Information Type Categories



user community: “Right back atcha! RT @WasteManagement: @Earth911 @HelpRecycle\_com @re3org @RecycleMatch @NCERrecycle @RRTwinCities #EcoMonday” (PP&EA, 114). Certain Agencies are much more active in their use of TWITTER CONVERSATIONS than others. For example, TWITTER CONVERSATIONS make up 29.7% of Tourism’s tweets but only 1.2% for the Wine Council. Re-tweets were only coded as TWITTER CONVERSATION if there was an indication that there was a back and forth between users, as in the PP&EA example above. It was far more common for re-tweets to pass along ANNOUNCEMENTS or other information. Re-tweets will be discussed in the next section.

PUBLIC SERVICE ANNOUNCEMENTS represent 5.8% of the tweets coded. PUBLIC SERVICE ANNOUNCEMENTS are tweets that raise awareness of an issue or inform the public of matters of immediate concern. For example: “Escape alert: Search underway for inmate missing from Alexander County prison construction crew. <http://bit.ly/cLiDB0>” (Corrections, 45) and “State air quality officials issue Code Orange alert for Friday in Charlotte, Triad and Triangle metro areas <http://bit.ly/doCSiE>” (Department of Natural Resources, 174). Most Agencies, like the Tourism Office and Wine Council, do not handle matters of public safety or well being, so frequent use of PUBLIC SERVICE ANNOUNCEMENTS is limited to the Department of Corrections, Department of Natural Resources and, to a lesser extent, the Highway Patrol. The 5% of the Museum of Natural Sciences’ PUBLIC SERVICE ANNOUNCEMENTS results mainly from museum closures due to weather events.

PRESS RELEASES make up 5.5% of the tweets coded. A PRESS RELEASE is an official statement from the tweeting organization announcing newsworthy

information or events. The line between an ANNOUNCEMENT and a PRESS RELEASE was thin, and coders' decisions often depended on the context provided by a URL. The formality of a tweet also indicated that it should be categorized as a PRESS RELEASE rather than an ANNOUNCEMENT or SELF PROMOTION: "Gov. Perdue Announces Contract for I-85 Improvement Project -- \$55 million Cheaper, Five Months Earlier Than Pro... <http://bit.ly>" (Governor's Office, 66). Like PUBLIC SERVICE ANNOUNCEMENTS, some agencies are more suited to PRESS RELEASE use than others. This is particularly true of the Governor's Office, which has the most frequent use of the PRESS RELEASE with 55 out of 71 of all Press Release instances.

SELF PROMOTION accounts for 3.6% of the total tweets. SELF PROMOTION tweets brag of accomplishments or talk-up achievements. The Highway Patrol has the most occurrences of SELF PROMOTION with tweets like: "Troopers Respond to Over 1,600 Calls for Service Across the State <http://fb.me/EQ3jG4nK>" (Highway, 5). SELF PROMOTION tweets often resemble ANNOUNCEMENTS in their brevity and the straightforward manner of presenting information, but they differ in their reference to organizational achievements and awards.

WEB NOTICES are used only in five cases, or .4% to the tweets examined. These tweets were used when there was a broken link or a web service that was not working: "The website is back up!" (Natural Science Museum, 138).

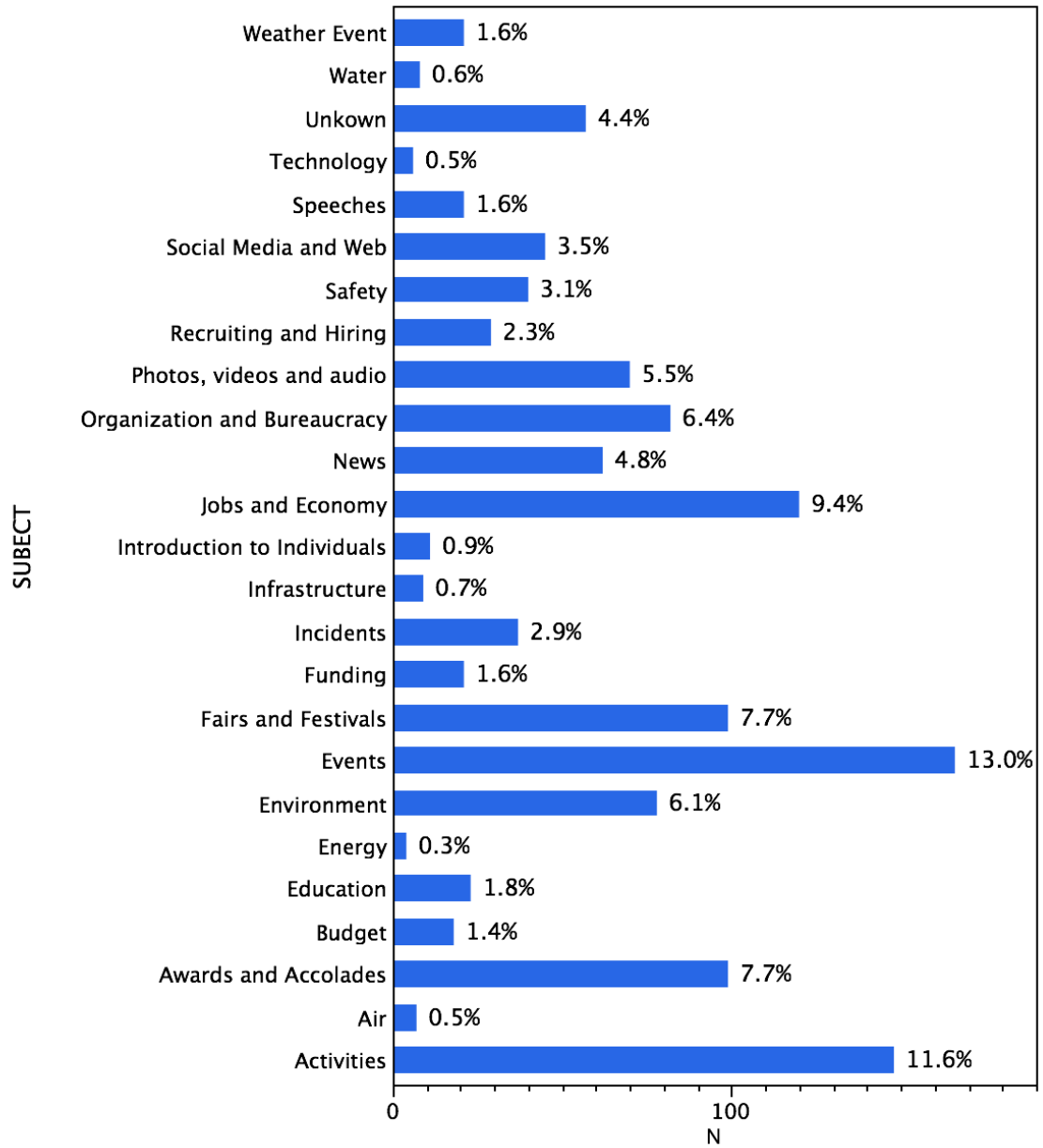
The diversity of the tweeting Agencies led to large number of Subject categories. As discussed above in the Methods section, the categories were created with the hope that they would be exhaustive but also broad enough that they could be used across Twitter feeds. For example, a Vines and Vineyards category was not

included as it is unlikely that it would be used outside of the Wine Council Twitter feed.

As seen in Figure 2, tweets most frequently announced an EVENT, 13%, or an ACTIVITY, 11.6%. Taken together, the similar subject categories of EVENTS, ACTIVITIES, and FAIRS AND FESTIVALS (7.7%) account for 32.3% of all tweets. With 9.4% of the total, JOBS AND THE ECONOMY is the third most frequently used Subject category. Tweets related to ORGANIZATION AND BUREAUCRATIC matters come in fourth with 6.4%. The frequency of other Subject categories falls gradually to subjects with very infrequent use, with TECHNOLOGY, .5%, and ENERGY, .3%, rounding out the bottom.

As is the case with Information Type categories, different Agencies utilize different Subject categories. The Department of Corrections frequently uses Twitter to warn the public of escaped prisoners (INCIDENTS) while the Department of Commerce announces the creation of jobs in the state (JOBS AND THE ECONOMY). Agencies such as the Tourism Office, Wine Council, and Museum of Natural Science hold a number of events and use Twitter as a way of passing along an invitation. Other Agencies, like the Department of Natural Resources and the Governor's Office, use Twitter to inform the public of issues concerning the public good. Despite an effort to create categories that could be used across Twitter feeds, the AIR, BUDGET, ENERGY, and WATER Subject categories were each used by only one Agency. These categories are among the least frequently used.

Figure 2. Tweet frequency by Subject Category



## Discussion

With ten different Agencies actively using Twitter, each with a different mission and area of expertise, it is not surprising that Twitter use by the North Carolina state government varies. Nevertheless, several conclusions can be drawn based on an analysis of the collected data and a comparison of the scholarly work discussed above. Each of the following conclusions will be discussed in turn below: first, that tweets broadly reflect the primary focus of the tweeting Agency; second, that levels of conversation via Twitter vary by Agency; and third, that although Twitter is used primarily as a one-way tool for broadcasting information to the public, interaction between the public and government agencies does occur.

As mentioned in the previous section, the ANNOUNCEMENT Information Type category makes up 54.6% of the tweets coded. Of this group, 32.9% reference an ACTIVITY, EVENT, or FAIR AND FESTIVAL Subject category. Only the Highway Patrol and Department of Corrections did not have a combined ACTIVITY, EVENT, and FAIR AND FESTIVAL frequency above 30%. Also, 54.9% of SOLICITATIONS AND EXHORTATIONS Information Type tweets are in regard to either ACTIVITIES, EVENTS, or FAIRS AND FESTIVALS. It is fair to say that Agencies in North Carolina are primarily using Twitter to publicize ACTIVITIES, EVENTS, and FAIRS AND FESTIVALS and to invite members of the public to join them. A breakdown of Subject and Information Type Categories by Agency can be found in Appendix C.

The Wine Council, Tourism Office, Department of Natural Resources, and Museum of Natural Science most frequently tweeted ACTIVITY focused messages. This tweet from the Wine Council provides a typical example: “Join Raffaldini

Vineyards this Sat. for the Four Seasons Wine Tasting Dinner w/ 4 seasonal food courses paired w/ wines <http://bit.ly/aPUeEM>" (Wine Council, 174). Readers are informed of, or invited to join, numerous events such as charity races, museum exhibits, and the State Fair. The fact that tweets from these Agencies most frequently fall into these three categories is not unexpected because their missions include engaging the public through activities and events.

Tweets from the five Agencies with a combined ACTIVITY, EVENT, and FAIR AND FESTIVAL score below 30% also reflect their mission and area of focus. For instance, the Highway Patrol most frequently tweets about matters of SAFETY while the Governor's Offices tweets are most often about JOBS AND THE ECONOMY, SPEECHES, and the BUDGET. 52% of the tweets from the Department of Commerce are about JOBS AND THE ECONOMY, whereas the Chief Information Officer used Twitter to share the panels and lectures he was attending. The trends in Agencies' Twitter categories lead to the simple conclusion that tweets from the ten active Twitter users line up with the primary missions of the Agencies.

In their 2010 study of Twitter use by Congressional Representatives, Golbeck, Grimes and Rogers write that many of the tweets they examined read like mini-press releases. In only two Agencies did tweets by North Carolina Agencies resemble a press release with any frequency. The 55 tweets coded as PRESS RELEASE in the Governor's Office are obvious in their correspondence to the traditional press release. The SELF PROMOTION Information Type category can also be seen as an informal press release. 14.9% of Highway Patrol tweets were coded with the SELF PROMOTION Information Type Category and the AWARDS AND ACCOLADES Subject

Category. For example: “Troopers to Receive Awards in Winston Salem Today: <http://bit.ly/3NVslF>” (Highway Patrol, 75). Taken together the PRESS RELEASE and SELF PROMOTION Information Type categories make up only 9.1% of all tweets, still far below the top three Information Type categories. However, the substance of the PRESS RELEASE and SELF PROMOTION Subject categories does differ. Most PRESS RELEASE tweets are focused on JOBS AND THE ECONOMY or ORGANIZATIONS AND BUREAUCRACY. The SELF PROMOTION category is, not surprisingly, self-referential, with AWARDS AND ACCOLADES comprising 47.8% of Subject tweets.

There is no agreed upon scholarly grammar or vocabulary when describing Twitter user intention or behavior, as one can see in the review of the literature discussed in the Related Works section above. Perhaps this lack of consensus is due to the fact that the study of Twitter, and Twitter itself, is relatively new. Every study, including this one, has developed its own set of descriptive categories to characterize user behavior; however, researchers have agreed that the focal points of Twitter use are conversation and personal status updates. Java, Song, Finin and Tseng call this core Twitter activity “Daily Chatter,” Honey and Herring call it “Self Experience” and Golbeck, Grimes and Rogers call it “Location/Activity.” These tweets are the “I’m eating a sandwich at the deli” messages one often associates with Twitter. For the purposes of this study this, “Pointless Babble,” as Pearson Analytics calls it, falls into the UNKNOWN Subject category. For example: “Oooo, I like the cardboard picnic basket. <http://ht.ly/2aae4> (Thanks @sha8088!)” (PP&EA, 140). Only 4.4% of tweets fall into the UNKNOWN category compared with 41% Self Experience found by Honey and Herring and 27% Location/Activity found by



Golbeck, Grimes and Rogers. Furthermore, in only five Agencies did UNKNOWN occur more than once. These five, in order of decreasing UNKNOWN frequency, are the Tourism Office, the Museum of Natural Science, PP&EA, the Governor's Office, and the Department of Commerce. If the five agencies with an UNKNOWN Subject frequency of one or fewer are dropped from the study, the frequency of the UNKNOWN Subject category rises to 6.7%, still far below the figures found by Honey and Herring and Golbeck, Grimes and Rogers. See Table 2 for a complete breakdown of these categories.

<i>Table 2.</i> Twitter Conversations and Unknown Categories by Agency		
<b>Agency</b>	<b>Twitter Conversation</b>	<b>Unknown</b>
Department of Commerce	5.8%	3.5%
Department of Corrections	.9%	0
Department of Environment & Natural Resources	5.5%	.7%
Museum of Natural Science	12.4%	9.1%
Office of the Governor	19.4%	5.2%
Pollution Prevention & Environmental Assistance	24.2%	7.8%
State Chief Information Officer	0	0
State Highway Patrol	2.1%	0
Tourism Office	29.7%	11.5%
Wine & Grape Council	1.2%	.6%

The five Agencies with the highest rates of UNKNOWN Subject category occurrence also had a greater frequency of the TWITTER CONVERSATION Information Type category. The total use of TWITTER CONVERSATIONS was 11.7%, a figure close to the 12.5% found by Java, Song, Finin and Tseng and the 12% found by Golbeck, Grimes and Rogers. But 11.7% falls far below the 30% found by Honey and Herring

and 20.4% found by Jansen, Zhang, Sobol and Chowdhury. If these five agencies are examined alone, the frequency of TWITTER CONVERSATIONS increases to 18.4%—approximately the same as Jansen, Zhang, Sobol and Chowdhury’s organizational Twitter conversation rate, but still lower than Honey and Herring. This division indicates that the Tourism Office, the Museum of Natural Science, PP&EA, the Governor’s Office, and the Department of Commerce employ Twitter in a manner that is more similar to the typical user than do the Highway Patrol, Department of Corrections, the Wine Council, Department of Natural Resources, and the State Chief Information Officer. For the remainder of this paper, the former group will be called “Twitter typical” and the latter “Twitter irregular.”

In many ways, however, these two groups are more similar than they are different. For example, a remarkable number of tweets, 1,042 or 81.3%, contain a URL, as can be seen in Table 3. The type of site linked to varies—the Highway Patrol links exclusively to its Facebook page, the Governor’s Office links to a number of official blogs and websites, while URLs from the Tourism Office often point to their interactive calendar. In their study of Twitter use, Java, Song, Finin and Tseng found that 13% of tweets contain a URL. 44.8% of Congressional tweets contained a URL according to Golbeck, Grimes and Rogers. In this study, only the Chief Information Officer had a low number of tweets containing URLs. If the Chief Information Officer is excluded, the Twitter irregular group had a URL rate above 90%. Agencies in the Twitter typical group had a URL rate ranging from 68% to 83%.

*Table 3.*

## Tweets Containing URL by Agency

<b>Agency</b>	<b>Number of URLs</b>	<b>% of Total</b>
Department of Commerce	142	82.5%
Department of Corrections	102	94.4%
Department of Environment & Natural Resources	138	95.2%
Museum of Natural Science	81	66.9%
Office of the Governor	91	67.9%
Pollution Prevention & Environmental Assistance	115	75.2%
State Chief Information Officer	2	9.0%
State Highway Patrol	86	91.2%
Tourism Office	124	75.2%
Wine & Grape Council	151	90.4%

When the large number of tweets containing URLs, the frequency of Twitter conversations, and the rate of Information Type categories are pulled together, a picture of Twitter as a means of government communication begins to emerge. Recall that Chadwick and May and Elmagarmid and McIver consider simple information dissemination the most basic form of e-Government. With the ANNOUNCEMENT Information Type category at 54.6% of the tweets coded, it is clear that the presentation of information, rather than conversation, is the primary purpose of most Agency tweets. If the related Information Type categories PUBLIC SERVICE ANNOUNCEMENT and PRESS RELEASE are combined with ANNOUNCEMENTS, they make up 65.9% of all tweets. The Subject categories also indicate that information presentation is the goal of Agency Twitter use. After all, only 4.4% of all tweets fall into the UNKNOWN Subject category, meaning that 95.6% of all tweets are about something other than conversation.

The connection between TWITTER CONVERSATION and UNKNOWN categories discussed above shows that to some degree the public is involved with the government via Twitter. The Twitter normal group uses Twitter to communicate with the public, and one can assume that the public is using Twitter to communicate with the government. Furthermore, the number of SOLICITATION AND EXHORTATION tweets also suggests an attempt to engage with members of the public. These tweets encourage participation, whether it is an invitation to an event: “Enjoy the Shallow Ford Wine Trail's Wine & Dine event on Fri. July 23 featuring wine pairings with food from the grill. <http://bit.ly/bBiFMn>” (Wine Council, 70) or a request for information or action: “What's in a name? You tell us! Join a focus group to help name our new wing on the night of 10/18. Apply here: <http://conta.cc/bhyEwf>” (Museum of Natural Science, 43). The combined frequency for the TWITTER CONVERSATIONS and SOLICITATIONS AND EXHORTATIONS categories is 30%.

However, the large number of URLs included in Agency tweets implies that the tweets are used as what Chadwick and May call the “push model” of information dissemination. Tweets with URLs do not necessarily inform in and of themselves; instead, they direct the public to information sources outside the Twitter feed. In many cases these tweets serve as a teaser for a longer messages and are cut off mid sentence: “Meet Gov. Perdue's guests - Blog by Ben Niolet, Director of New MediaOffice of the Governor: Gov. Perdue will te... <http://bit.ly/eCDPAu>” (Governor’s Office, 43). The number of re-tweets also indicates a push model of information dissemination. Like attached URLs, re-tweets serve to direct the reader to information. With both devices the tweeting Agency is sharing information with

the public. 21.1% of all tweets in this study are re-tweets. 65.7% of those re-tweets fell into the ANNOUNCEMENTS Information Type category as shown in Table 4.

<i>Table 4.</i> Re-tweets by Information Type		
<b>Information Type</b>	<b>Count</b>	<b>% of Total</b>
Announcements	138	65.7
Press Releases	5	2.4
Public Service Announcements	8	3.8
Self Promotion	5	5
Solicitations and Exhortations	42	42
Twitter Conversations	12	12
<b>Total</b>	<b>210</b>	

Despite the large number of URLs used by these Agencies, their use of Twitter goes far beyond one-dimensional information broadcasting. For example, SOLICITATIONS AND EXHORTATIONS appear in all ten Agency feeds. Although a majority of the tweets in this category invite the public to ACTIVITIES, EVENTS, and FAIRS AND FESTIVALS, there were a number that invited readers to participate in discussions or provide information. For example, many tweets from the Governor's Office ask readers to take part in *The Budget Challenge*, an interactive website where you can choose which government services to cut in order to reduce North Carolina's budget deficit. Tweets from the Tourism Office direct readers to Facebook threads where they can share ideas: "Got a favorite place for a first date? Share your idea here: <http://on.fb.me/hPazDa>" (Tourism, 54). And, while most of tweets in the TWITTER CONVERSATION Information Type Category are responses to other users, there are several that seek to initiate conversation, such as this example from PP&EA: "Two

days until Christmas! What's your favorite eco-gift to give or receive?" (PP&EA, 24). Chadwick and May call this a consultive form of e-Government: agencies seek information from citizens in order to inform the decision making process, as is the case in the Governor's Office. By seeking comments and initiating discussions, these Agencies promote communication between members of the public. These examples, and the level of TWITTER CONVERSATIONS in general, show that Twitter communication is not simply communication between individuals and Agencies. Instead, the frequency of conversation and consultation suggest a movement towards Twitter as a participatory means of government communication.

Based on this analysis of the data collected and compared with prior scholarly work, it is clear that Twitter use by North Carolina State Agencies differs from personal use. The degree of difference, however, varies. Certain Agencies are more likely than others to take an active role in Twitter discussions. Regardless of their level of conversation, all Agencies use Twitter to broadcast information related to their mission or area of focus to the public. In the context of e-Government, the combination of conversational characteristics and information broadcasting leads to the conclusion that Twitter is not being used as a radically new type of government communication.

### **Limitations and Further Study**

Riffe, Lacy and Fico caution against nonprobabilistic convenience samples, such as the tweets collected for this study, warning that the results can be limited or misleading. However, in order to complete this study in the time allotted a

convenience sample was necessary. Some Agencies tweeted so infrequently that building a corpus of randomly selected tweets could take months, if not years. For example, it took the Department of Corrections 18 months to tweet the 135 messages examined. It is hoped that a probabilistic sample can be collected in any future studies of government Twitter use.

The large number of Subject categories also limits the strength of the conclusions. As discussed in the Methods section above, Subject categories were developed and refined throughout the coding process. Several Subject category groups, however, caused problems and confusion. The overlap between ACTIVITIES, EVENTS and FAIRS AND FESTIVALS was particularly troubling, but a decision was made to preserve the three separate categories at the conclusion of coding. ACTIVITIES were conceived of as lively affairs where individuals or groups can take an active role in a specific pastime. The study defined EVENTS as a more passive category—information is presented for individual consumption. FAIRS AND FESTIVALS are group, and often themed functions composed of a variety of activities and events. The distinction between these categories is slight and, in retrospect, less important than originally thought. It would be wise to collapse the Subject categories in future studies. Ten or twelve Subjects would be more manageable and could be as comprehensive as the current 25. Also, such a collapse would most likely increase the statistical significance and lend a greater degree of certainty to chi-square and other correlation calculations.

It is hoped that future studies will take into account the work of W. Russell Neuman. Writing in the early 1990's, Neuman used quantitative methods to study

the effect of technology on the media and the public at large. Despite the comparative age of his works in what is a rapidly evolving field, they serve to balance some of the more utopian ideas of many e-Government scholars. Given time, it is hoped that any future study would incorporate Neuman's methods in the same way this study was influenced by Golbeck, Grimes and Rogers and Honey and Herring.

These studies, and the related scholarly work discussed throughout, have begun to develop a baseline for future research. Armed with the results of this study, future scholars can undertake a more robust and significant examination of government social media use. Such a study should use qualitative and empirical methods to test the conclusions discussed above.

### **Conclusion**

In many ways the results of this study seem self-evident. For example, the fact that Agencies are using Twitter to send out messages related to their mission or area of focus is hardly unexpected. However, the data also presents interesting and unexpected conclusions, particularly when results are compared with the works of other scholars. Half of the Agencies surveyed use Twitter as a way of conversing with the public, half do not. All Agencies are more likely to use Twitter as a way of broadcasting information than the typical Twitter user. It is, therefore, safe to conclude that Twitter use by North Carolina State Agencies differs significantly from other users.



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## Appendix A

### Information Type and Subject Categories

#### Information Type.

- [A] Announcements: A statement about a fact, occurrence, or intention. An announcement is usually simply stated.  
*New photos of the Thanksgiving marathon on flickr*
- [B] Notices: For this purpose a notice is a message about the Twitter Feed or the organization's website or web services.  
*Previous link broken, here's the live one <http://bit.ly/49018h>*
- [C] Press Release: Messages that announce newsworthy events or information. Most often include the words *Press Release* in the Tweet or Reference Text. Links to blog posts are also to be considered Press Releases. Tweets that promote events or activities exclusive to the Tweeting organization that are currently happening or will happen in the immediate future should be considered Press Releases.  
*Press Release – Gov. announces new round of rule changes*  
*Watch the #SOTS live tonight: <http://bit.ly/737ndn>*
- [D] Public Service Announcement: A Tweet that benefits the public interest by raising awareness of an issue or event. Matters of immediate concern or immediate safety like escaped or captured inmates, weather events or, missing children should be considered Public Service Announcements.  
*Heavy rains may cause flooding in Western counties. drive safely!*
- [E] Self Promotion: Tweets that act as a booster to the Tweeting organization. Essentially a brag.  
*4 of our employees won the NC Award for Excellence: <http://bit.ly/10f34h>*
- [F] Solicitations and exhortations: Tweets that invite the reader to engage in an event or activity or to provide information. Solicitations and exhortations ask the reader to join a group at an event, vote in an online poll, or provide information or an opinion. Tweets that simply announce an event (The Trail Festival is this Saturday) should be considered announcements. Tweets that invite participation (Come enjoy the re-opening of the trail this weekend) should be considered Solicitations and exhortations.  
*Let us know your favorite restaurant to take a first date: <http://bit.ly/10934v>*
- [G] Twitter Conversations: "Twitter Speak" Tweets may contain little information and are used as part of a Twitter conversation. Can be a reply message or seek to initiate a conversation. Tweets that begin @[username] are directed at an individual and should be considered a Twitter Conversation. RT

@[username], or re-Tweets, or forwarded messages, and should not be categorized as a Twitter Conversation.

@hotbot, Thanks of info check this out <http://bit.ly/4hlk49>

## Subjects.

1. Activities: Can be an individual activity like biking or a group activity like a race or sporting event. Projects or artwork are categorized here. Not to be confused with *events* or *fairs and festivals*.
2. Air: Air quality, air pollution, and emissions.
3. Awards: Can include awards ceremonies, medals.
4. Budget: Tweets relating to the budget and budget process. Announcements of funds awarded or raised should use *funding*.
5. Education: Tweets related to schools, the school system, or individual classes.
6. Energy: Power plants, alternative forms of energy like solar or wind, and power lines and stations.
7. Environmental: Recycling, green technology, resource conservation, the preservation of natural resources, and wildlife.
8. Events: Symposiums, meetings, lectures, etc. A fine line between *activities*, *fairs and festivals*, and *events*.
9. Fairs and festivals: Group activities, usually themed. For example, the State Fair or Yadkin Valley wine festival. Museum exhibits fall under fairs and festivals.
10. Funding: Announcements concerning money and awards of funds to specific groups or projects.
11. Incidents: Usually a one time occurrence that disturbs the normal flow. May be serious, like an escaped prisoner or mundane like a chicken disrupting traffic (a real tweet).
12. Infrastructure: Having to do with the construction and renovation of roads, bridges, dams, parks, etc. Does not include *energy* Tweets.
13. Introduction to individuals: Messages that introduce people—famous or not.
14. Jobs and economy: Tweets that advertise jobs added or lost or economic growth or decline. Usually a booster message like “ABC Group to hire 500 people in Charlotte.” Not to be confused with *Recruiting and hiring*”
15. News: Messages that report that something happened. Can be used in many cases, try to use sparingly.
16. Organizations and Bureaucracy: Messages having to do with personnel, promotions or new appointments. Also, Tweets having to do with agency structure, changes in procedure, or policy.
17. Photos, video and audio: Tweets that link to videos or photographs.
18. Recruiting and hiring: Tweets that announce that the Tweeting organization is hiring workers. Can be volunteer opportunities. Tweets that announce that other organizations are hiring should use *Jobs and economy*.
19. Safety: Tips and suggestions about personal and group safety
20. Social Media: Tweets that reference social media sites. “The Agency has a new Facebook page” for example.

21. Speeches: Including the State of the State address.
22. Technology: Technological advancements or technologically focused products
23. Water: Water quality, water pollution
24. Weather events: Tweets having to do with storms or other weather.
25. Unknown: Tweet does not contain enough information to categorize. Most likely part of a Twitter conversation. Please use sparingly.

## Appendix B

### Inter-coder Reliability Calculations

*Table 5.*  
Inter-coder Reliability by Information Type

<b>Agency</b>	<b>Coders A&amp;B</b>	<b>Coders A&amp;C</b>	<b>Coders B&amp;C</b>
Department of Commerce	1	.9848	.9531
Department of Corrections	.9773	.9545	.9565
Department of Environment & Natural Resources	.95	.9310	.9824
Museum of Natural Science	.9787	.8775	.9787
Office of the Governor	.9231	.9434	.9216
Pollution Prevention & Environmental Assistance	.9393	.9047	.8889
State Chief Information Officer	.875	.875	.9
State Highway Patrol	.95	.930	.8158
Tourism Office	.9552	.9538	.875
Wine & Grape Council	.9242	.9545	.8824
<b>Weighted Mean</b>	<b>.9628</b>	<b>.9343</b>	<b>.9155</b>

*Table 6.*  
Inter-coder Reliability by Subjects

<b>Agency</b>	<b>Coders A&amp;B</b>	<b>Coders A&amp;C</b>	<b>Coders B&amp;C</b>
Department of Commerce	.8182	.9242	.9375
Department of Corrections	.8636	.8864	.8696
Department of Environment & Natural Resources	.8167	.8448	.8772
Museum of Natural Science	.8085	.9184	.9149
Office of the Governor	.9231	.8113	.9804
Pollution Prevention & Environmental Assistance	.8182	.8095	.8889
State Chief Information Officer	.75	.875	.9
State Highway Patrol	.925	.9189	.8684
Tourism Office	.8359	.9231	.9531
Wine & Grape Council	.7879	.8788	.8382
<b>Weighted Mean</b>	<b>.8455</b>	<b>.8341</b>	<b>.9018</b>

*Table 7.*  
Information Type Inter-Coder Reliability by Coder

<b>Reliability</b>	<b>Coders A&amp;B</b>	<b>Coders A&amp;C</b>	<b>Coders B&amp;C</b>
Crude Reliability	.9535	.9430	.9173
Scott's $\pi$	.9273	.9124	.8687

*Table 8.*  
Subject Inter-Coder Reliability by Coder

<b>Reliability</b>	<b>Coders A&amp;B</b>	<b>Coders A&amp;C</b>	<b>Coders B&amp;C</b>
Crude Reliability	.8256	.8160	.9035
Scott's $\pi$	.8103	.8674	.8969

Crude Reliability

$$PA_0 = A/n$$

Where  $PA_0$  stands for "proportional agreement, observed," A is the number of agreements between two coders, and  $n$  is the total number of units the two coders have co-coded for the test.

Scott's  $\pi$

$$\frac{PA_0 - PA_E}{1 - PA_E}$$

Where  $PA_0$  stands for "proportional agreement, observed," and

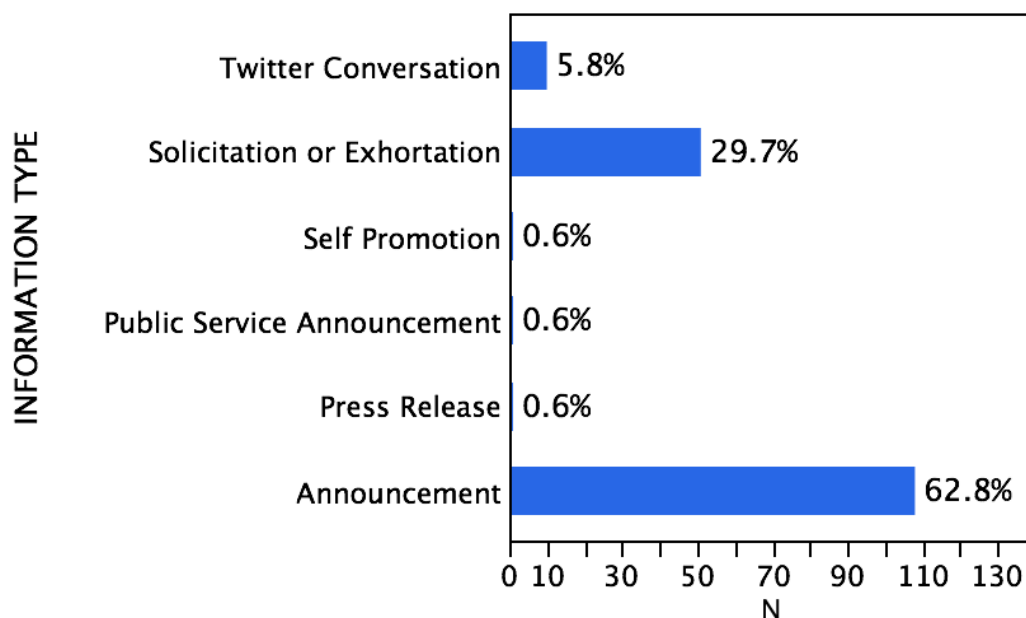
$$PA_E = \sum p_i^2 \text{ and}$$

$p_i$  = Joint marginal proportions (calculations above taken from Neuendorf, p. 149)

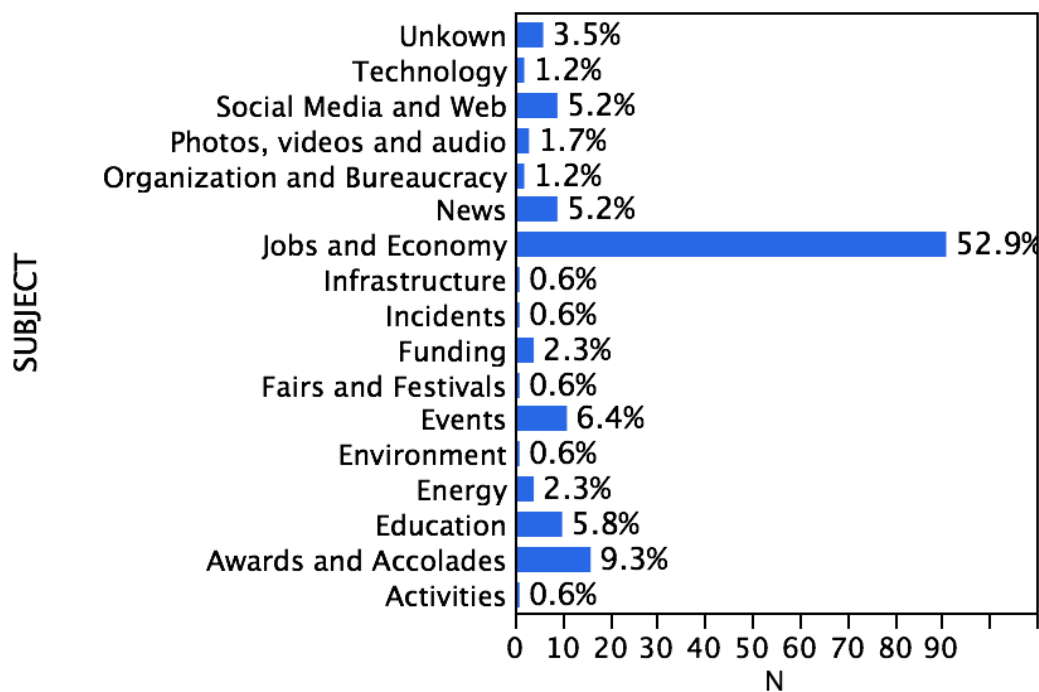
## Appendix C

### Information and Subject Categories by Agency

#### Dept. of Commerce by Information Type

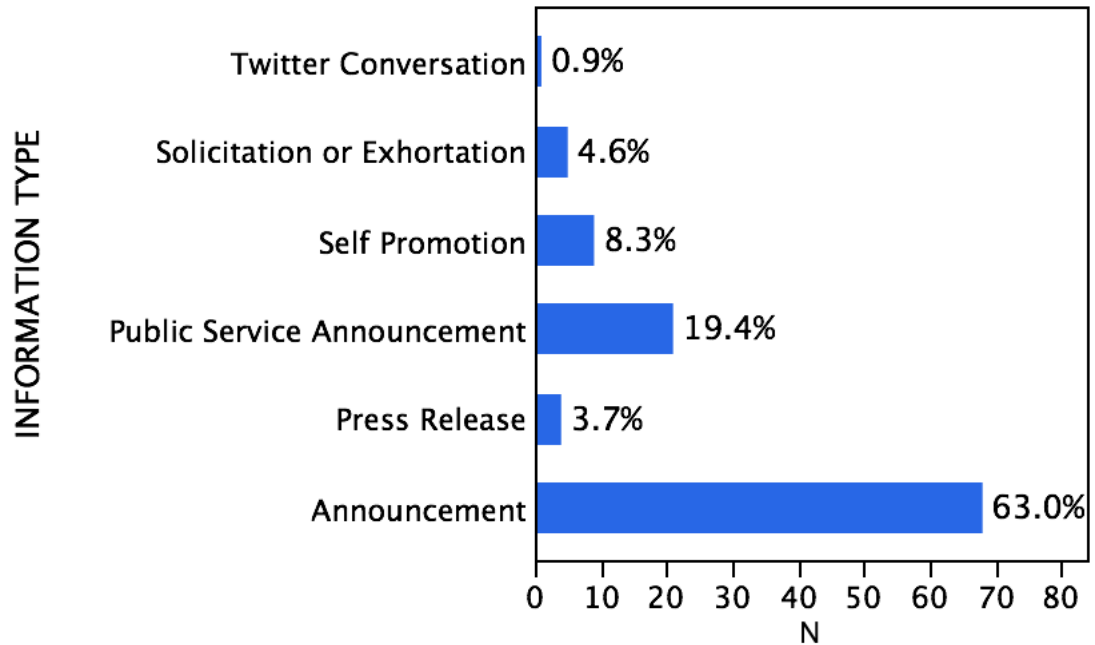


#### Dept. of Commerce by Subject

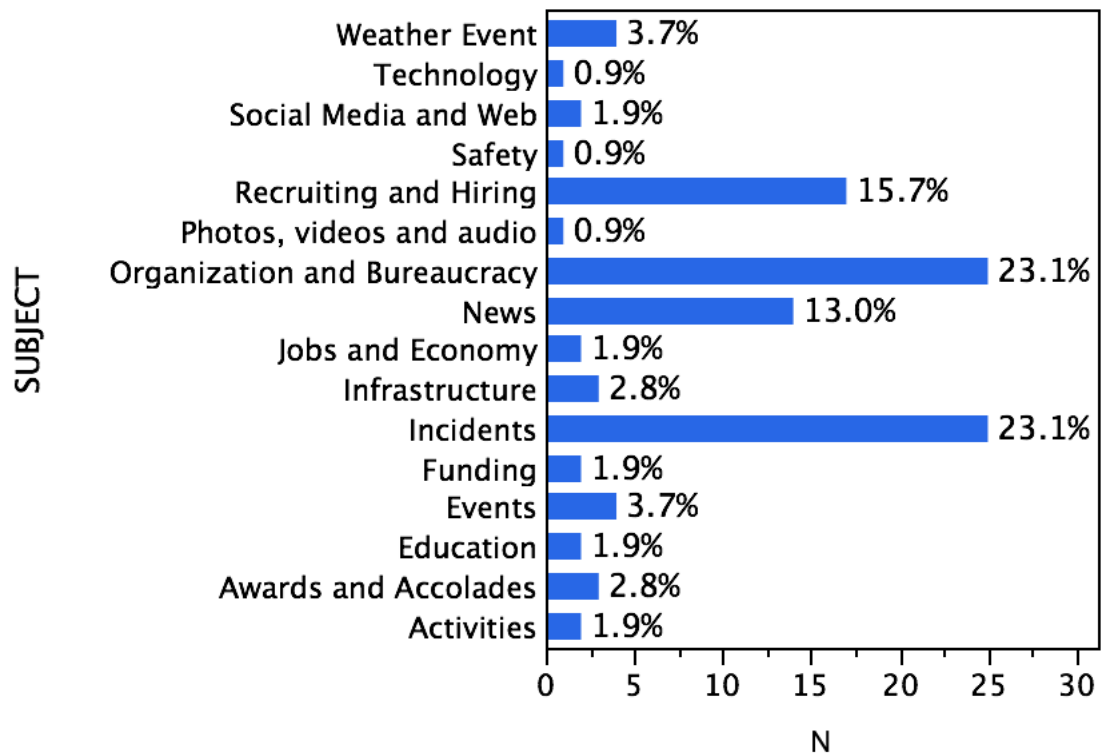




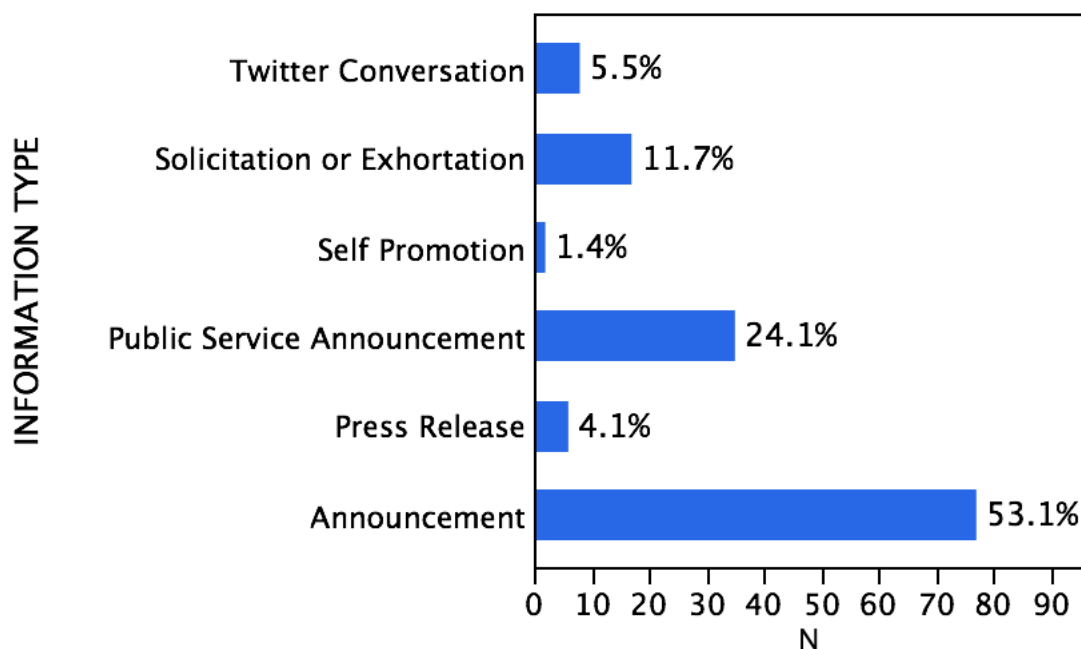
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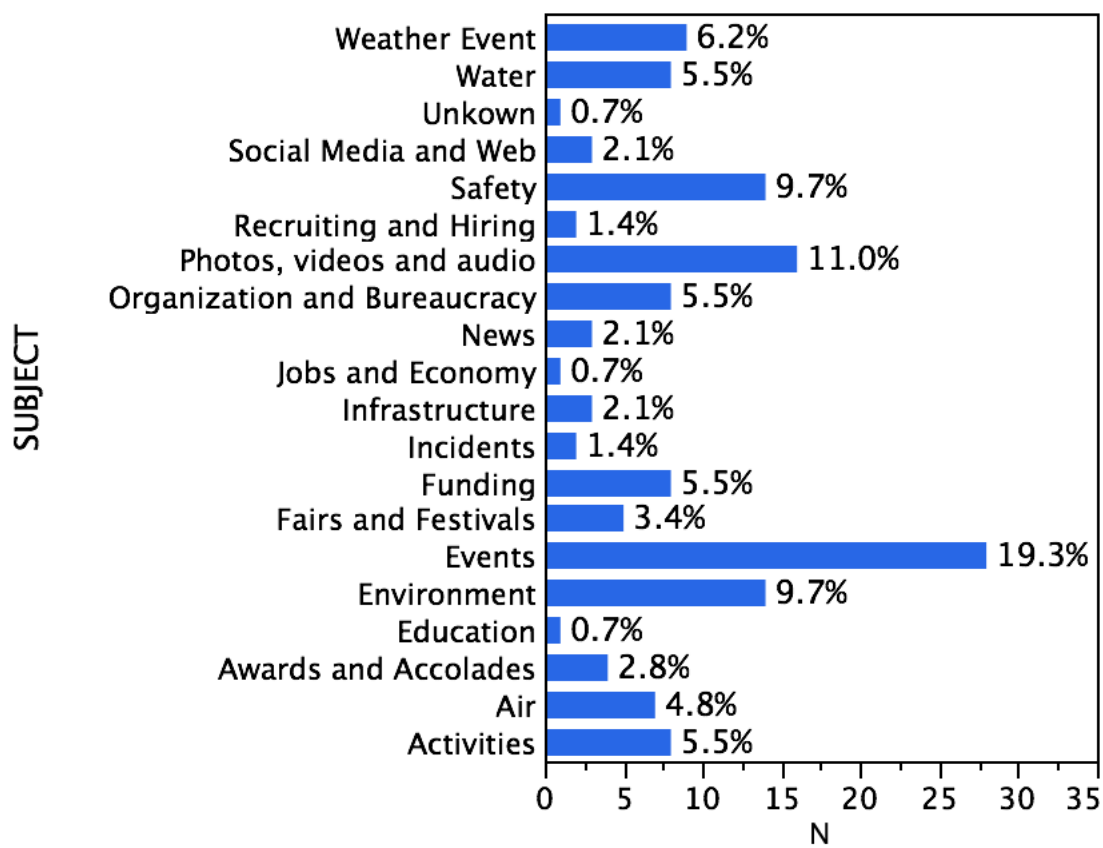
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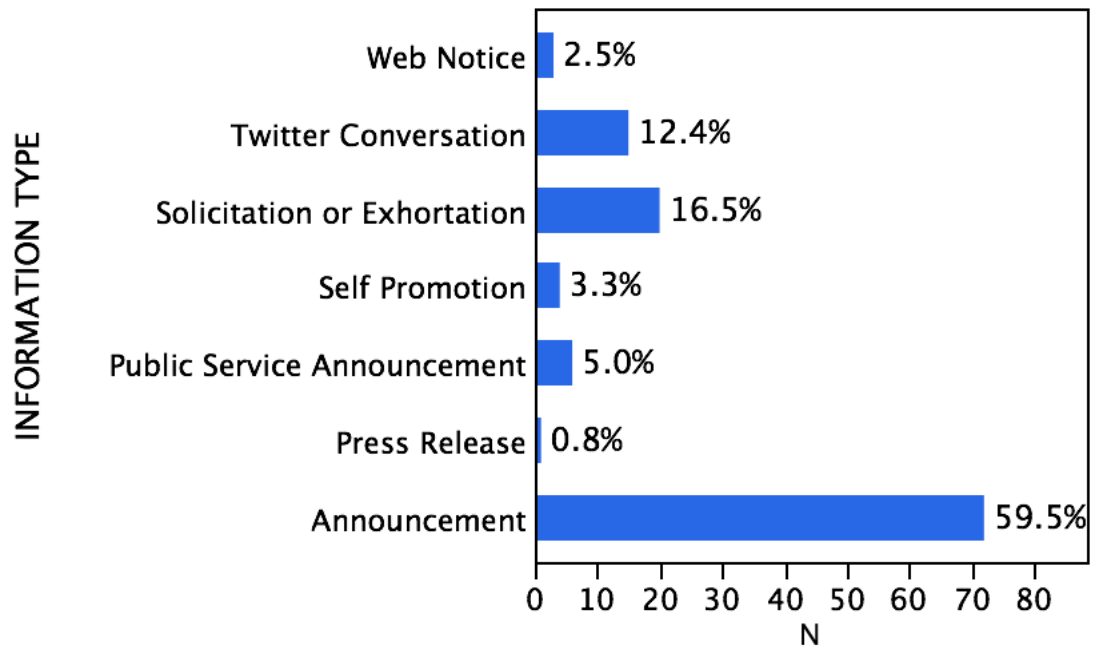
### Dept. of Environment and Natural Resources by Information Type



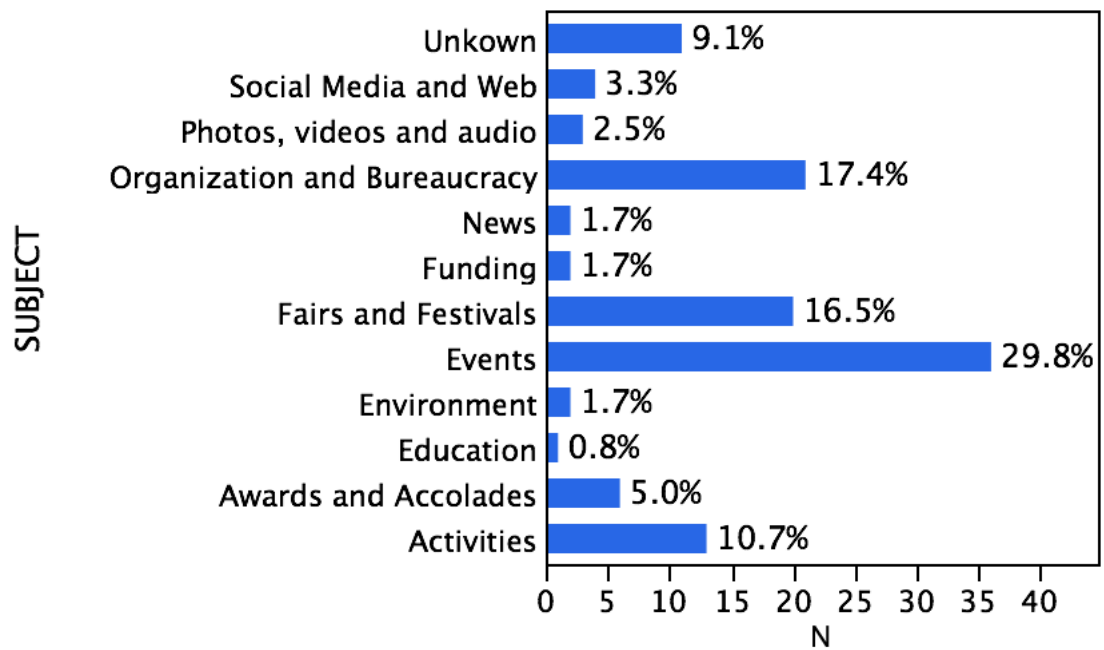
### Dept. of Environment and Natural Resources by Subject



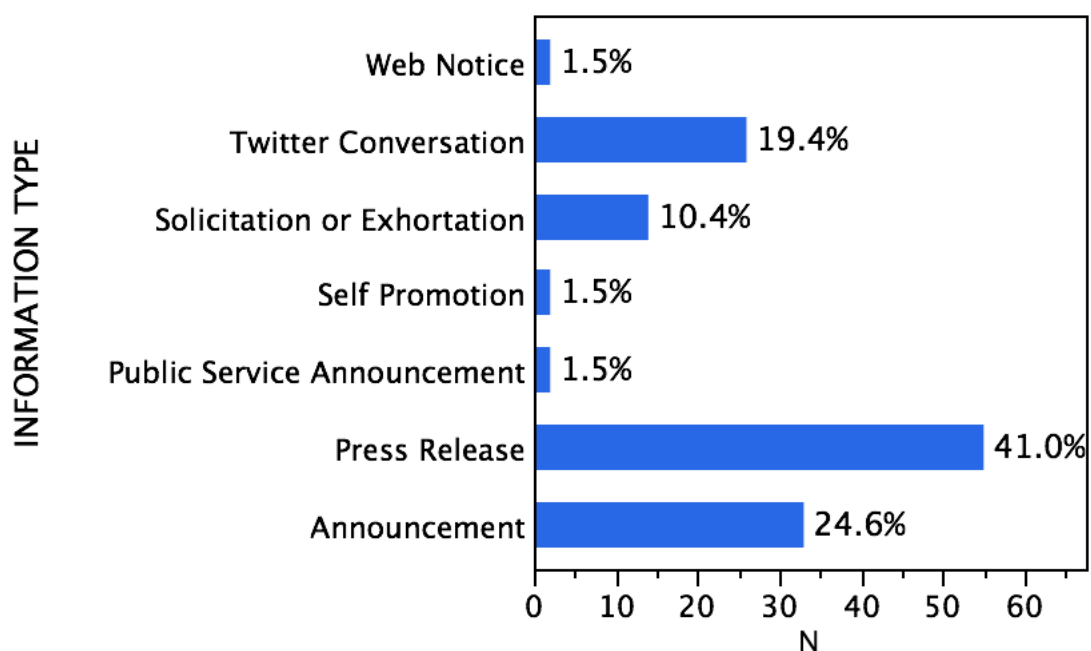
### Museum of Natural Science by Information Type



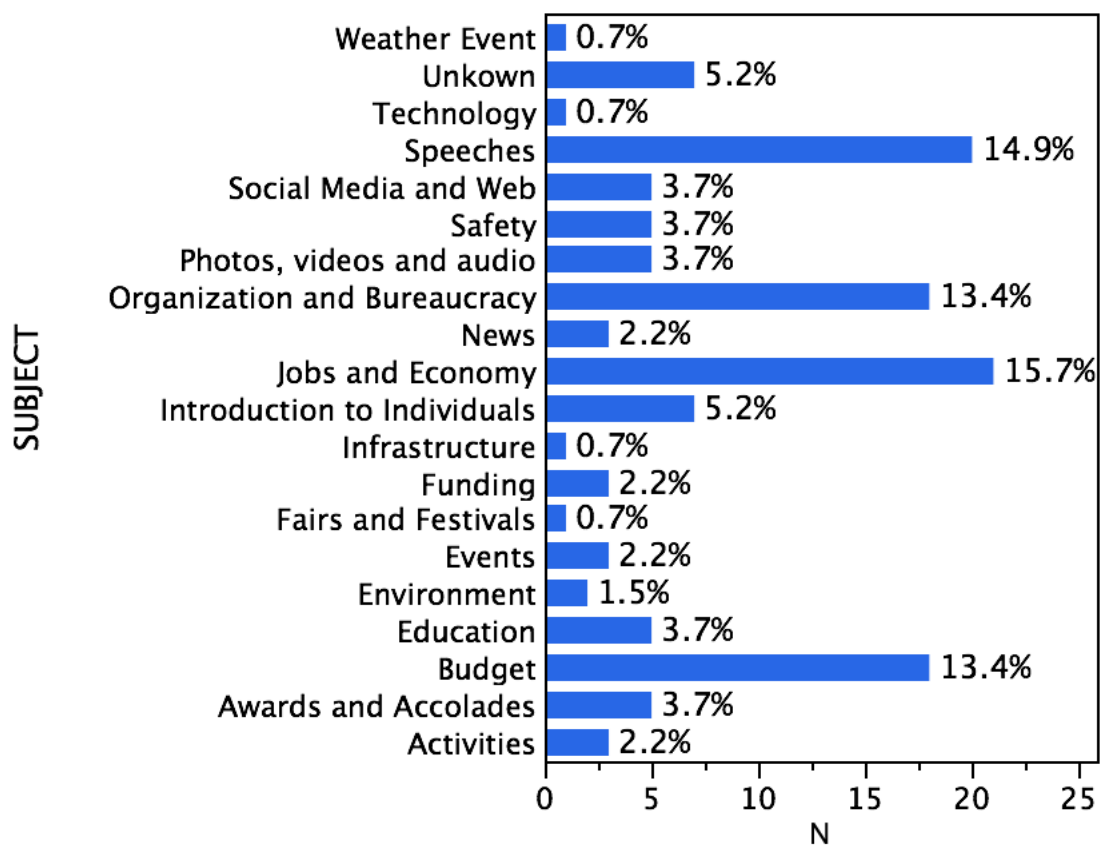
### Museum of Natural Science by Subject



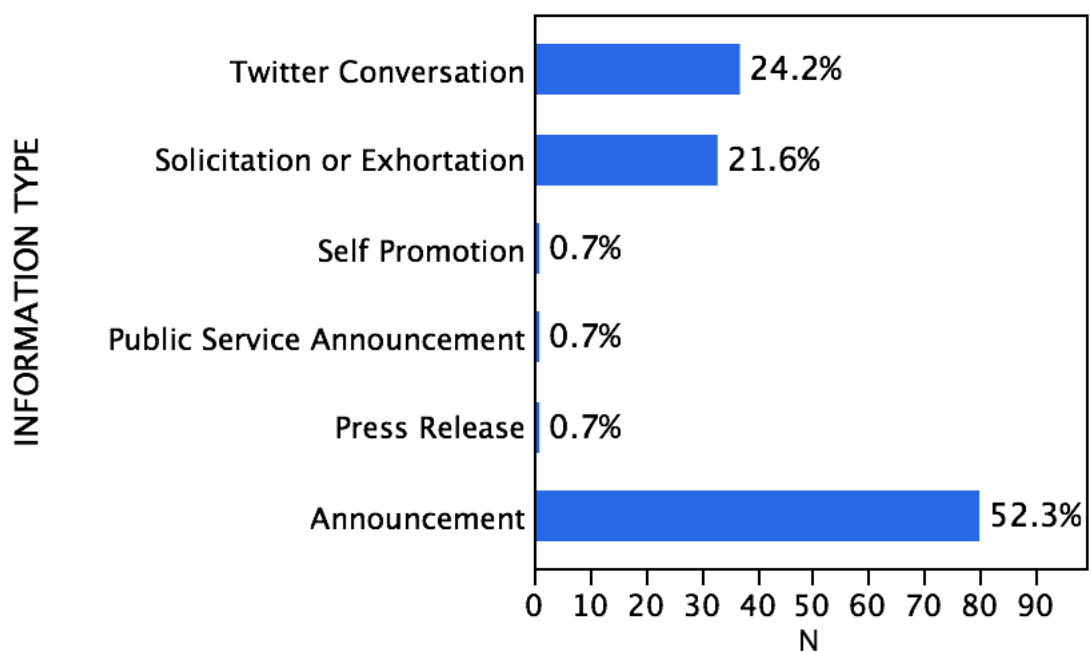
### Office of the Governor by Information Type



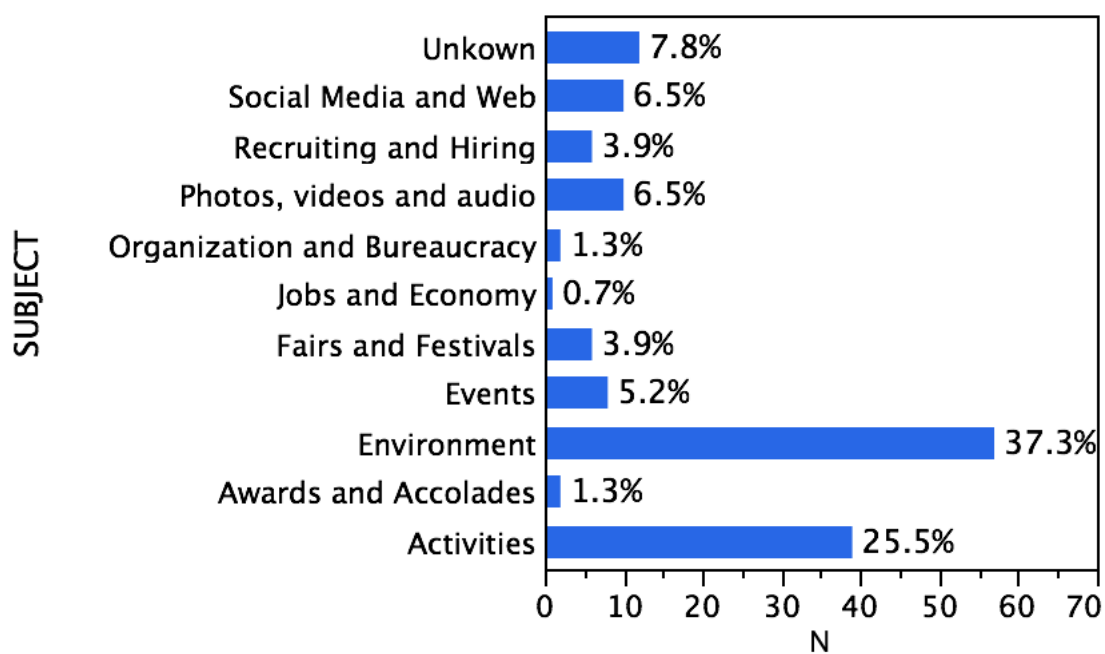
### Office of the Governor by Subject



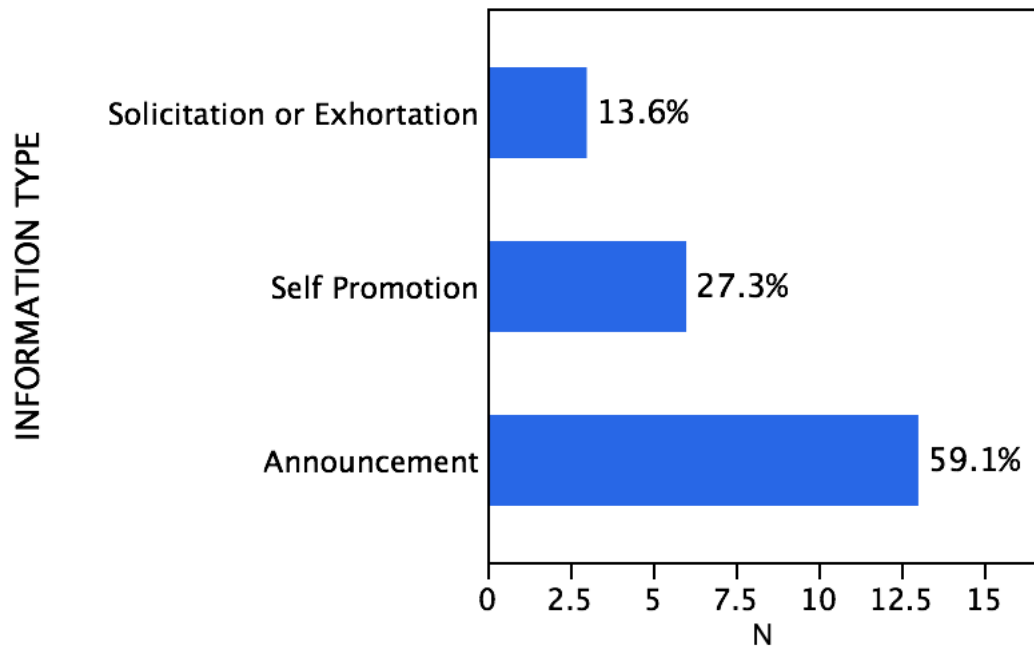
### PP&EA by Information Type



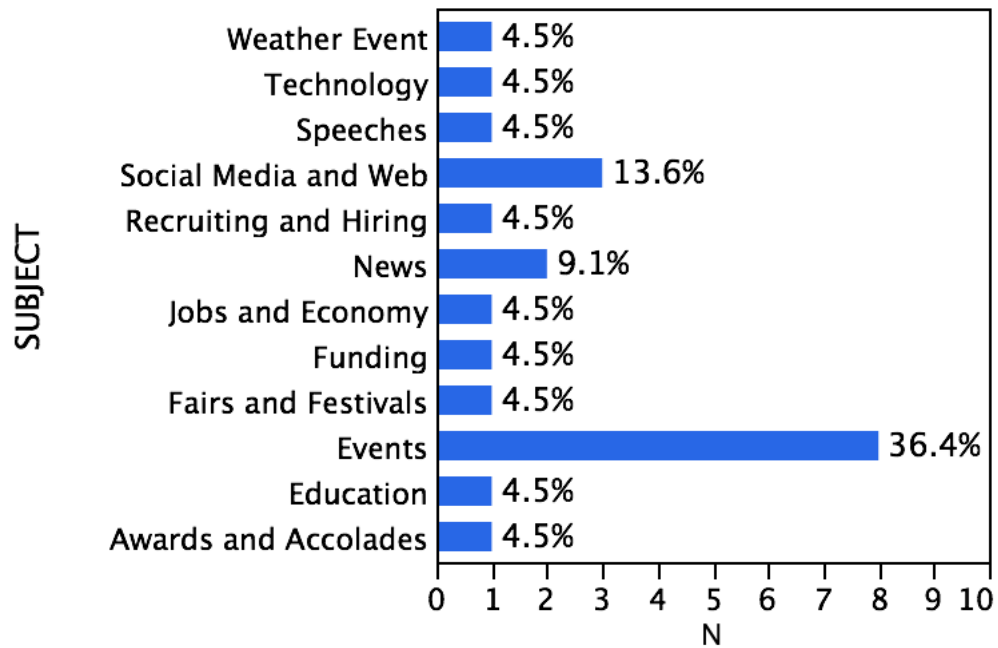
### PP&EA by Subject



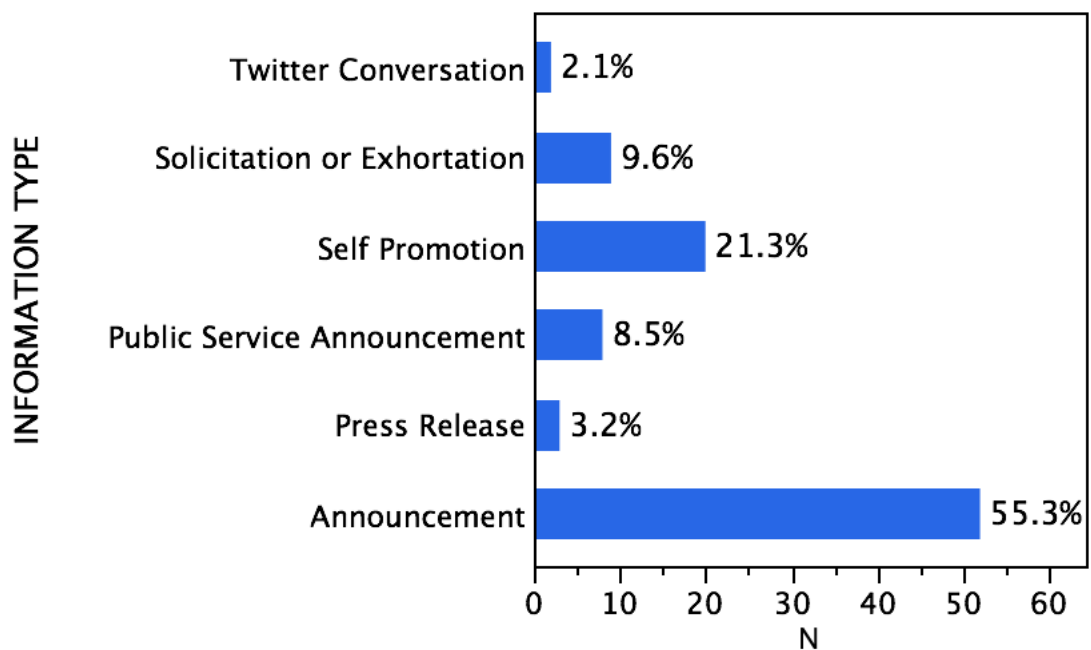
### State Chief Information Officer by Information Type



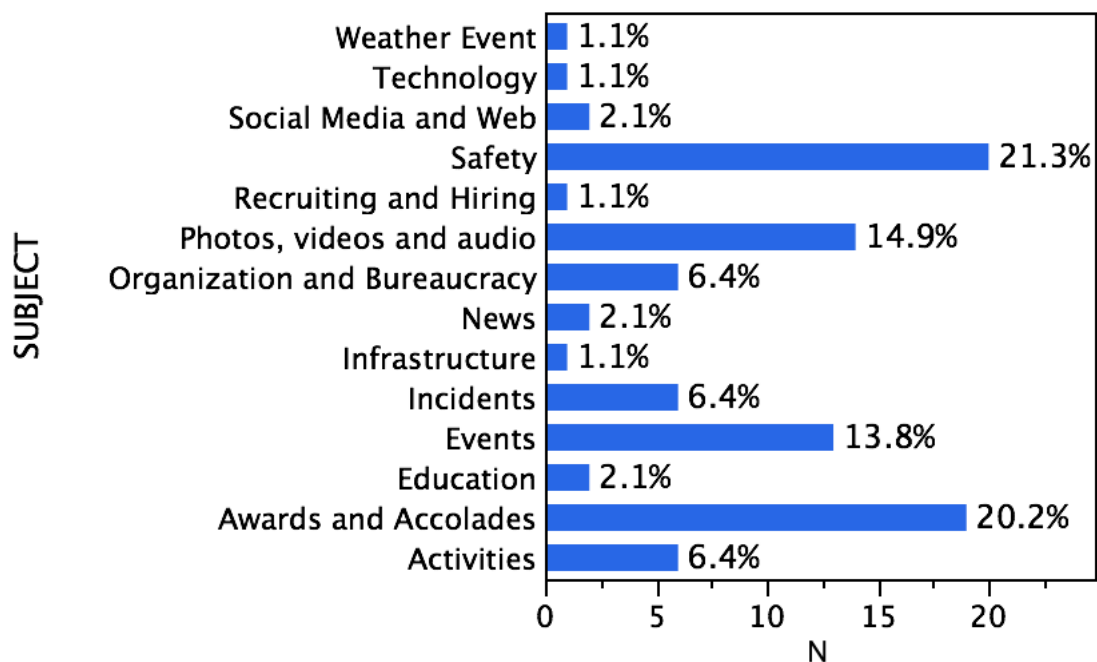
### State Chief Information Officer by Subject

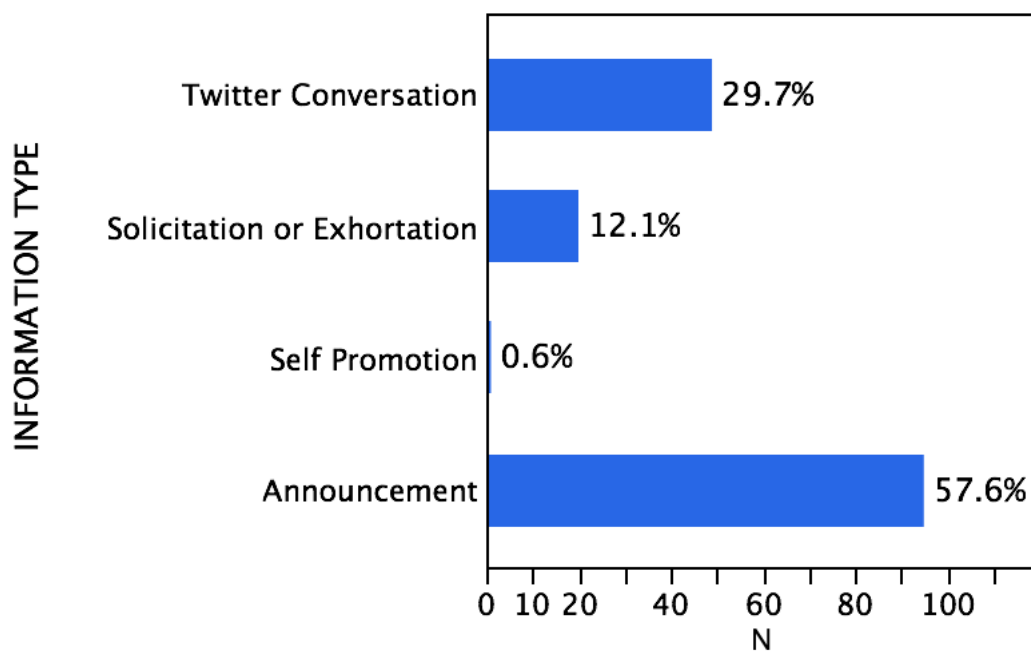
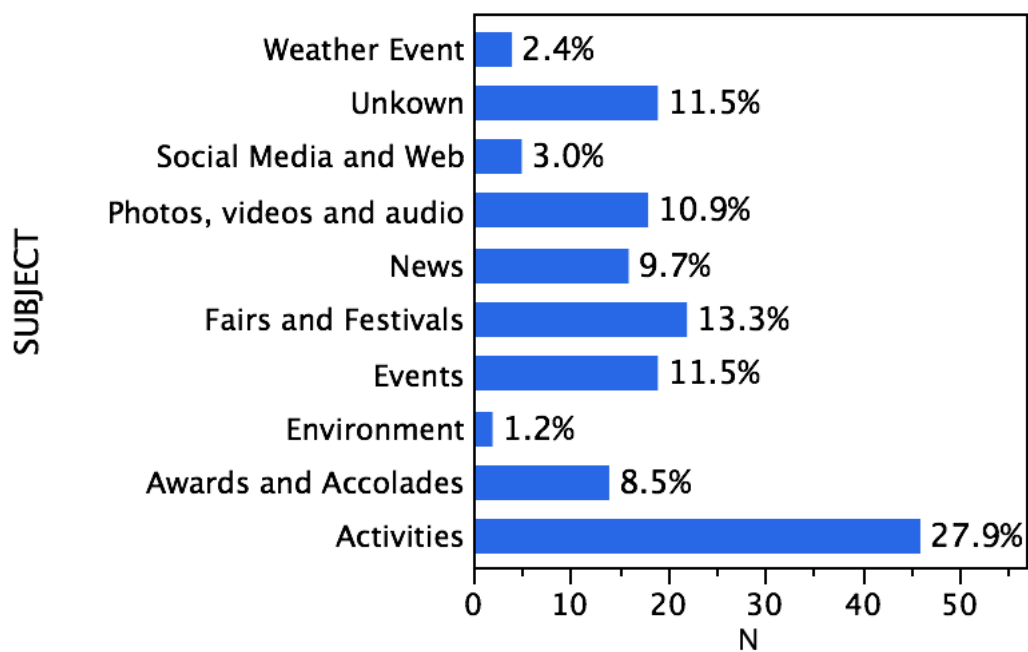


### State Highway Patrol by Information Type



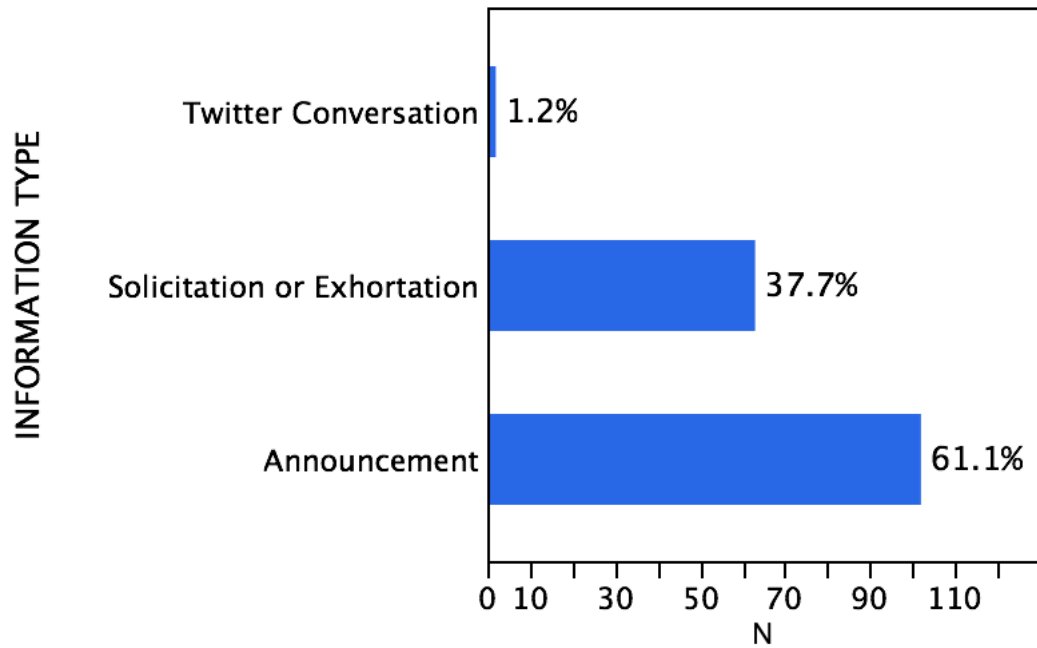
### State Highway Patrol by Subject



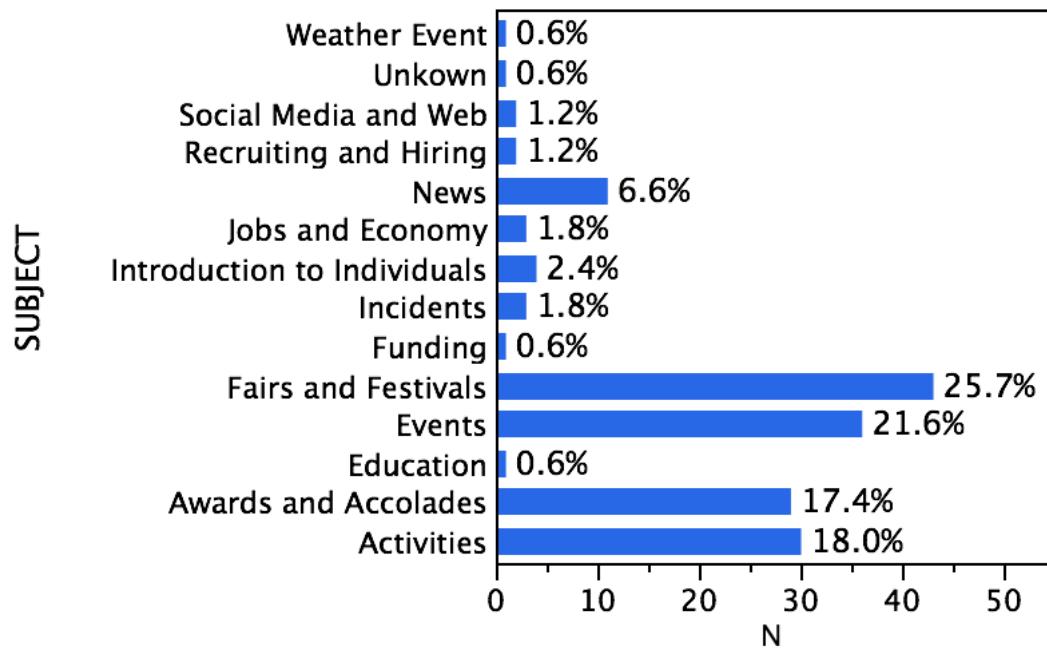
**Tourism Office by Information Type****Tourism Office by Subject**



### Wine and Grape Council by Information Type



### Wine and Grape Council by Subject



Appendix D Total Occurrences by Subject and Information Type Categories									
Category	Announcement	Press Release	Public Service Announcement	Self Promotion	Solicitation or Exhortation	Twitter Conversation	Web Notice	Total	
Activities	72	4	0	1	47	24	0	148	
Air	0	1	6	0	0	0	0	7	
Awards and Accolades	65	4	0	22	6	2	0	99	
Budget	6	1	0	1	7	3	0	18	
Education	14	4	0	1	3	1	0	23	
Energy	2	0	0	0	2	0	0	4	
Environment	53	3	2	1	8	11	0	78	
Events	107	2	2	3	39	13	0	166	
Fairs and Festivals	51	1	0	0	43	4	0	99	
Funding	15	2	0	2	2	0	0	21	
Incidents	14	0	22	0	1	0	0	37	
Infrastructure	6	1	0	0	1	1	0	9	
Introduction to Individuals	8	0	0	0	0	3	0	11	
Jobs and Economy	76	16	0	0	27	1	0	120	
News	47	3	1	3	4	4	0	62	
Organization and Bureaucracy	46	14	8	4	5	5	0	82	
Photos, videos and audio	56	1	0	0	9	4	0	70	
Recruiting and Hiring	23	1	0	0	5	0	0	29	
Safety	11	2	20	2	4	1	0	40	
Social Media and Web	8	2	1	2	16	11	5	45	
Speeches	7	4	0	0	2	8	0	21	
Technology	3	1	0	1	1	0	0	6	
Unknown	2	4	0	0	1	50	0	57	
Water	3	0	3	0	1	1	0	8	
Weather Event	5	0	9	3	1	3	0	21	
Total	700	71	74	46	235	150	5	1281	